

BAT46 Series

Small signal Schottky diodes

Main product characteristics

I _F	150 mA
V _{RRM}	100 V
C (typ)	6 pF
T _j (max)	150° C

Features and benefits

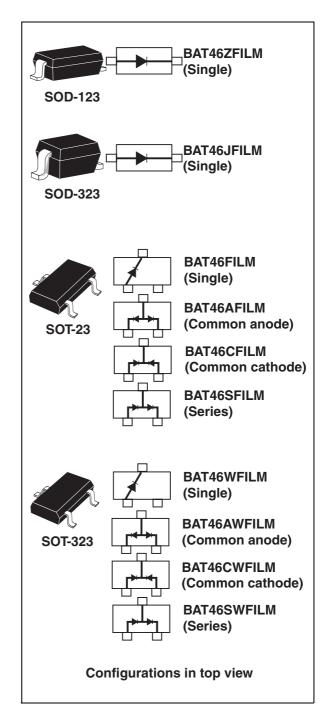
- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Surface mount device

Description

Diodes in the BAT46 series are high voltage, small signal Schottky diodes suited for protection and routing operations.

Order codes

Part Number	Marking
BAT46ZFILM	Z46
BAT46FILM	S46
BAT46AFILM	A46
BAT46CFILM	C46
BAT46SFILM	B46
BAT46WFILM	D46
BAT46AWFILM	DB6
BAT46CWFILM	DB8
BAT46SWFILM	B46
BAT46JFILM	46



Characteristics BAT46 Series

1 Characteristics

Table 1. Absolute ratings (limiting values at $T_i = 25^{\circ}$ C, unless otherwise specified)

		1		
Symbol	Parameter	Parameter		
V _{RRM}	Repetitive peak reverse voltage	100	V	
I _F	Continuous forward current	150	mA	
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms Sinusoidal	1	Α
T _{stg}	Storage temperature range	-65 to +150	° C	
T _j	Maximum operating junction temperature (1)	150	° C	
TL	Maximum soldering temperature ⁽¹⁾		260	° C

^{1.} Pulse test: t_p = 380 $\mu s,\,\delta$ < 2 %

Table 2. Thermal parameters

Symbol	Parameter	Value	Unit	
D	Junction to ambient ⁽¹⁾	SOD-123, SOT-23	500	°C/W
R _{th(j-a)}	ounction to ambient	SOT-323, SOD-323,	550	O/ VV

^{1.} On epoxy printed circuit board with recommended pad layout

Table 3. Static electrical characteristics

Symbol	Parameter	Test co	onditions	Min.	Тур	Max.	Unit
			V _R = 1.5 V			0.5	
		T _ 05° C	V _R = 10 V			0.8	
	I _R ⁽¹⁾ Reverse leakage current	T _j = 25° C	V _R = 50 V			2	
ı (1)			V _R = 75 V			5	μΑ
'R` ′		T _j = 60° C	V _R = 1.5 V			5	
			V _R = 10 V			7.5	
			V _R = 50 V			15	
			V _R = 75 V			20	
V _F ⁽²⁾ Forward voltage d			I _F = 0.1 mA			0.25	
	Forward voltage drop	T _j = 25° C	I _F =10 mA			0.45	V
			I _F =250 mA			1	

^{1.} Pulse test: t_p = 5 ms, δ < 2 %

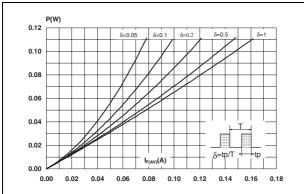
Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
	Diode capacitance	V _R = 0 V, F = 1 MHz		10		рF
		V _R = 1 V, F = 1 MHz		6		рг

^{2.} Pulse test: t_p = 380 μ s, δ < 2 %

BAT46 Series Characteristics

Figure 1. Average forward power dissipation Figure 2. Average forward current versus versus average forward current ambient temperature ($\delta = 1$)



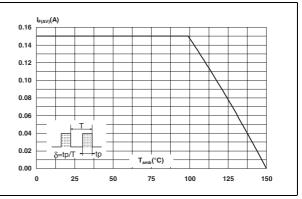
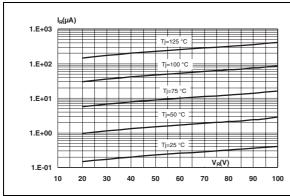


Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

Figure 4. Reverse leakage current versus junction temperature



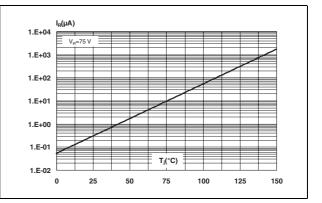
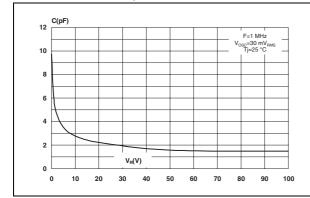
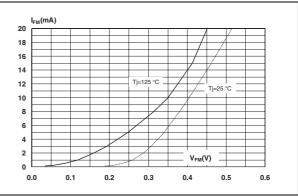


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

Figure 6. Forward voltage drop versus forward current (typical values, low-level)

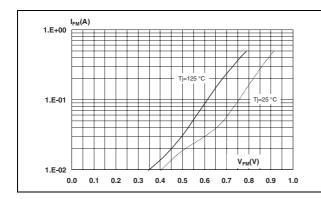




Characteristics BAT46 Series

Figure 7. Forward voltage drop versus forward current (typical values, high-level)

Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - printed circuit board, epoxy FR4 e_{CU} = 35 µm (SOD-323)



1.00 Z_{h(j-a)}/R_{h(j-a)}

... Single pulse
SOD-323

0.10

Epoxy FR4
S_{Cu}=2.25 mm²
e_{cu}=35 jm
1.E-02

1.E-01

1.E+00

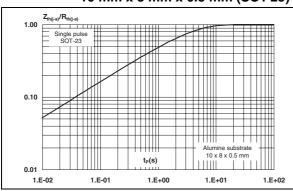
1.E+01

1.E+02

Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration - aluminium oxide substrate

10 mm x 8 mm x 0.5 mm (SOT-23)

Figure 10. Variation of thermal impedance junction to ambient versus pulse duration - printed circuit board, epoxy FR4, e_{CU} = 35 μm (SOT-323)



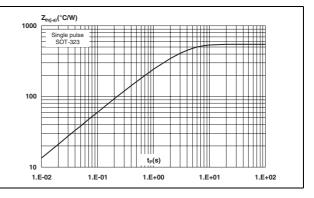
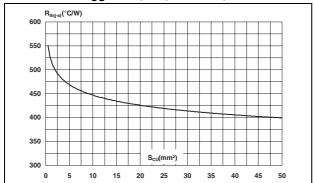
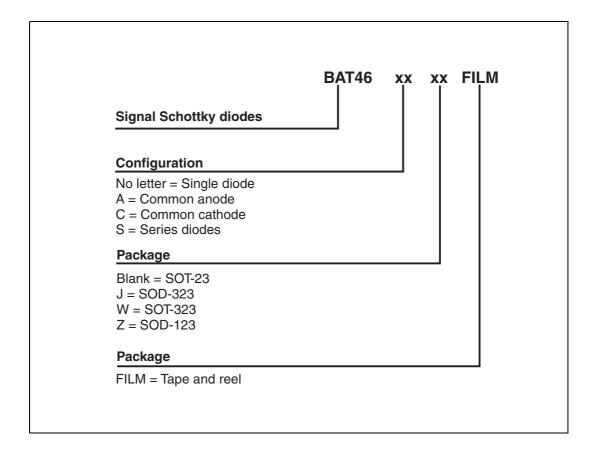


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead, epoxy FR4, e_{CU} = 35 µm (SOD-323)



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2 Ordering information scheme



Package information BAT46 Series

Package information 3

Epoxy meets UL94, V0

Table 5. **SOD-123 dimensions**

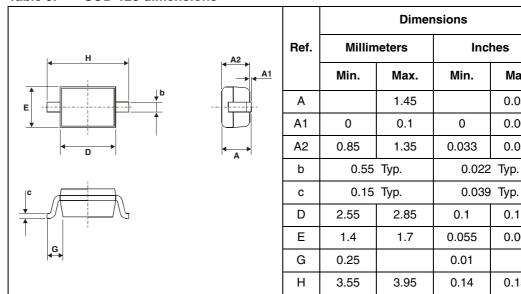
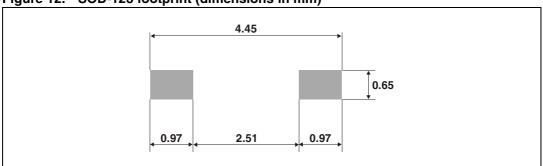


Figure 12. SOD-123 footprint (dimensions in mm)



Max.

0.057

0.004

0.053

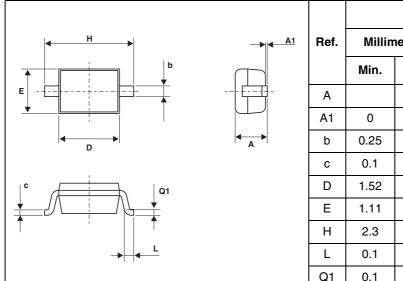
0.112

0.067

0.156

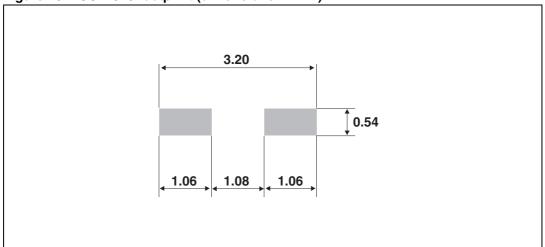
BAT46 Series Package information

Table 6. SOD-323 dimensions



	Dimensions					
Ref.	Millin	neters	Inc	hes		
	Min.	Max.	Min.	Max.		
Α		1.17		0.046		
A1	0	0.1	0	0.004		
b	0.25	0.44	0.01	0.017		
С	0.1	0.25	0.004	0.01		
D	1.52	1.8	0.06	0.071		
Е	1.11	1.45	0.044	0.057		
Н	2.3	2.7	0.09	0.106		
L	0.1	0.46	0.004	0.02		
Q1	0.1	0.41	0.004	0.016		

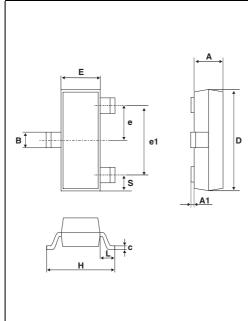
Figure 13. SOD-323 footprint (dimensions in mm)



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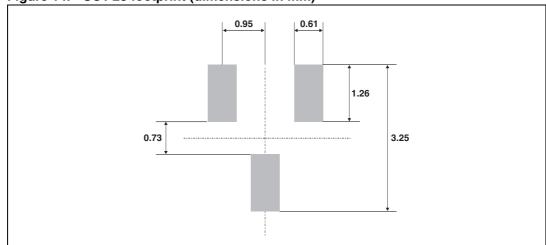
Package information BAT46 Series

Table 7. SOT-23 dimensions



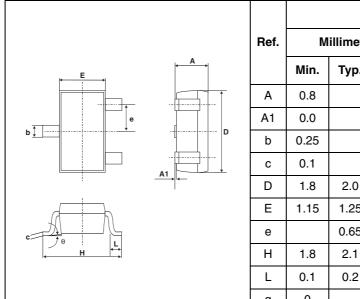
	Dimensions				
Ref.	Millim	neters	Inc	hes	
	Min.	Max.	Min.	Max.	
Α	0.89	1.4	0.035	0.055	
A1	0	0.1	0	0.004	
В	0.3	0.51	0.012	0.02	
С	0.085	0.18	0.003	0.007	
D	2.75	3.04	0.108	0.12	
е	0.85	1.05	0.033	0.041	
e1	1.7	2.1	0.067	0.083	
Е	1.2	1.6	0.047	0.063	
Н	2.1	2.75	0.083	0.108	
L	0.6 typ.		0.024	4 typ.	
S	0.35	0.65	0.014	0.026	

Figure 14. SOT-23 footprint (dimensions in mm)



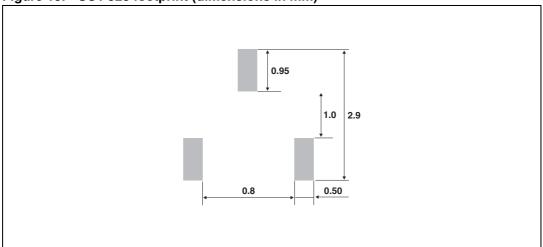
BAT46 Series Package information

Table 8. SOT-323 dimensions



	Dimensions					
Ref.	М	illimete	rs		Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	0.8		1.1	0.031		0.043
A1	0.0		0.1	0.0		0.004
b	0.25		0.4	0.010		0.016
С	0.1		0.26	0.004		0.010
D	1.8	2.0	2.2	0.071	0.079	0.086
Е	1.15	1.25	1.35	0.045	0.049	0.053
е		0.65			0.026	
Н	1.8	2.1	2.4	0.071	0.083	0.094
L	0.1	0.2	0.3	0.004	0.008	0.012
q	0		30°	0		30°

Figure 15. SOT-323 footprint (dimensions in mm)



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Ordering information BAT46 Series

4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
BAT46ZFILM	Z46	SOD-123 Single	10 mg	3000	Tape and reel
BAT46FILM	S46	SOT-23 Single	10 mg	3000	Tape and reel
BAT46AFILM	A46	SOT-23 Common anode	10 mg	3000	Tape and reel
BAT46CFILM	C46	SOT-23 Common cathode	10 mg	3000	Tape and reel
BAT46SFILM	B46	SOT-23 Series	10 mg	3000	Tape and reel
BAT46WFILM	D46	SOT-323 Single	6 mg	3000	Tape and reel
BAT46AWFILM	DB6	SOT-323 Common anode	6 mg	3000	Tape and reel
BAT46CWFILM	DB8	SOT-323 Common cathode	6 mg	3000	Tape and reel
BAT46SWFILM	B46	SOT-323 Series	6 mg	3000	Tape and reel
BAT46JFILM	46	SOD-323	5 mg	3000	Tape and reel

5 Revision history

Date	Revision	Description of Changes
Jun-1999	3	Previous revision.
25-Jul-2006	4	BAT46Z, J, W datasheets merged. ECOPACK statement added.

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